National Aeronautics and
Space Administration

Office of Policy and Plans

Overview of the NASA Strategic Management System

Matt Crouch
Director of Strategic Planning

August 2001

Presentation Overview

- NASA Implementation of the Results Act
- NASA Strategic Management Documents & Schedules
- NASA Strategic Framework
- NASA Management Structure & Processes
- Roadmaps & Performance Planning
- Bush Government Reform Agenda
- www.plans.nasa.gov as a Resource

Government Performance and Results Act (GPRA)

PURPOSE:

- Improve the confidence of the American people in the capability of the Federal Government, by systematically holding Federal agencies accountable for achieving program results;
- Improve Federal program effectiveness and public accountability by promoting a new focus on results, service quality, and customer satisfaction;
- Improve internal management of the Federal Government.

Government Performance and Results Act (GPRA)

PURPOSE (continued):

- Help Federal managers improve service delivery, by requiring that they plan for meeting program objectives and by providing them with information about program results and service quality;
- Improve congressional decision-making by providing more objective information on achieving statutory objectives, and on the relative effectiveness and efficiency of Federal programs and spending.

NASA Strategic Management System

Government Performance and Results Act (GPRA)

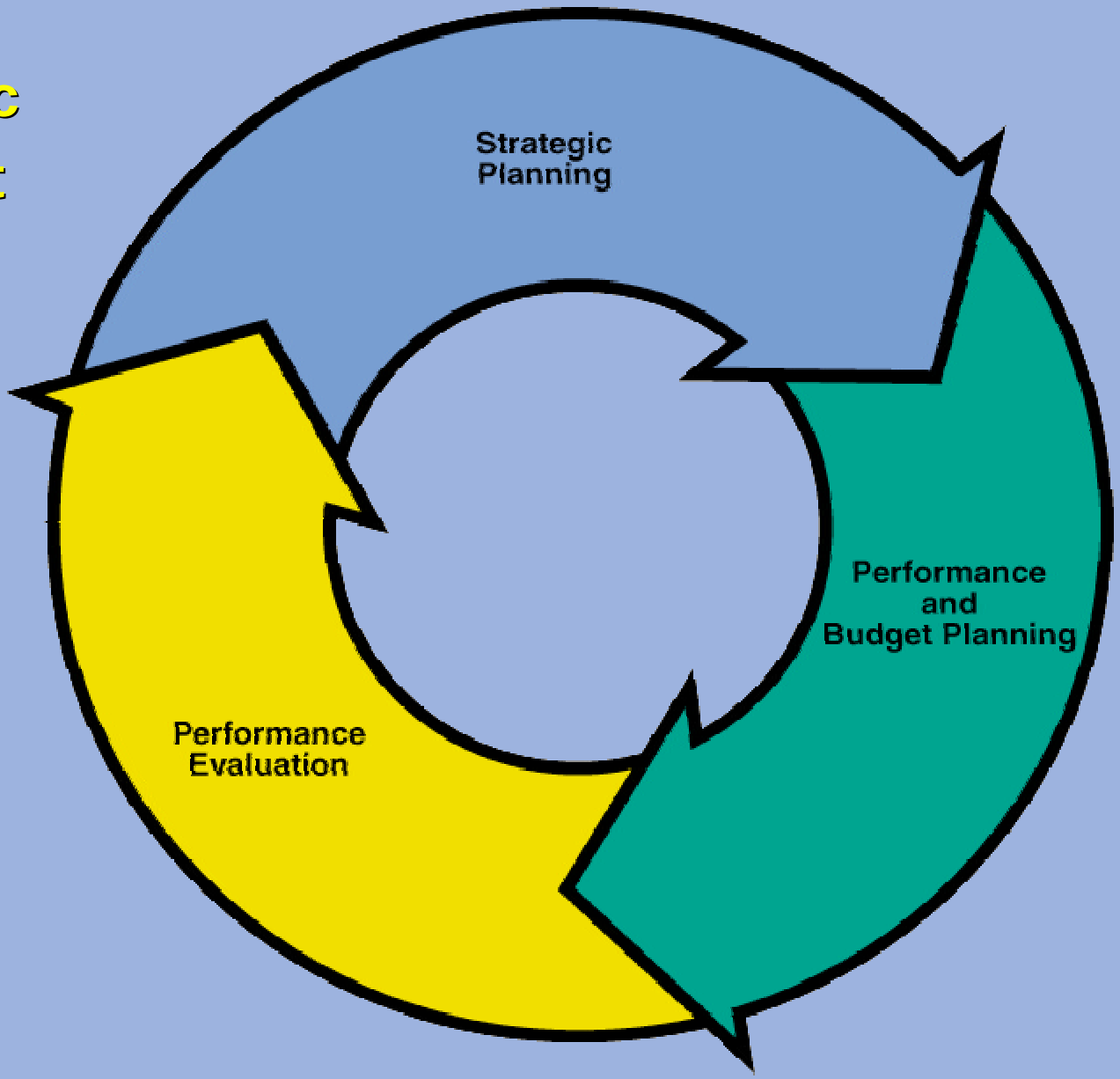
REQUIRES:

- **Strategic Plans**
  - describe agency missions & goals
- **Performance Plans**
  - establish measurable performance indicators necessary to achieve agency goals
- **Performance Reports**
  - report actual performance measured against the established performance indicators

NASA Strategic Management System

The Strategic Management Cycle

Three phases in a cycle based on the Results Act



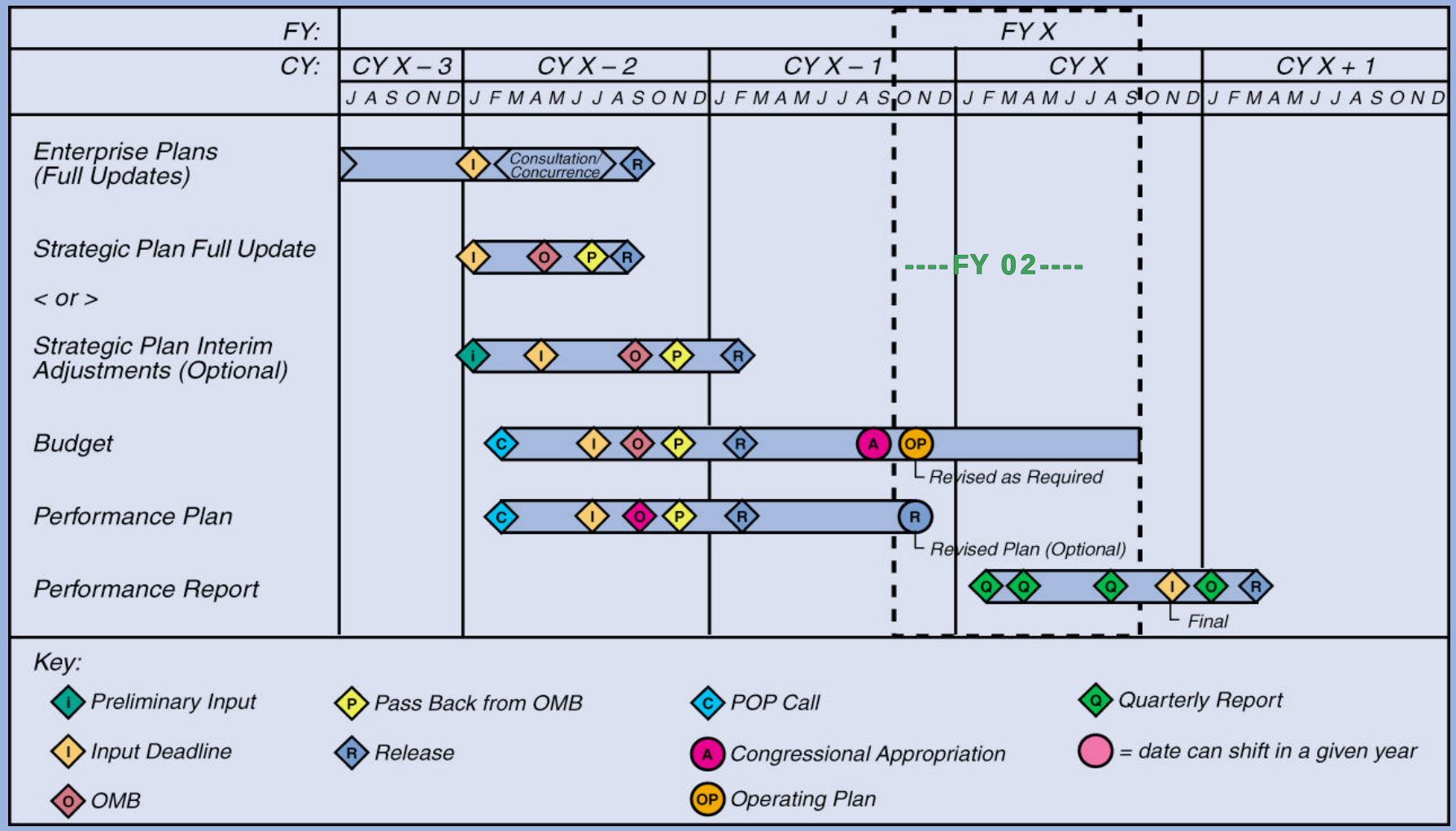
NASA Strategic Management Documents

- **Strategic Management Handbook** ***(Red Book)***
  - ⇒ 1rst Edition - October 1996 - 2nd Edition in Mar. 2000
- **Strategic Plan**
  - ⇒ First GPRA official (1998) - released September 1997
  - ⇒ 1999 Interim Adjustments - released February 1999
  - ⇒ 2000 Full Update - released Sept. 2000 ***- Next full update Sept. '03***
- **Performance Plans**
  - ⇒ FY '99 - released Mar. 1998 - Revised Feb. 1999
  - ⇒ FY '00 - released Mar. 1999
  - ⇒ FY '01 - released Feb. 2000 - Revised June 2001
  - ⇒ FY '02 - released July 2000 ***- FY '03 - Due Feb. 2002 w/ FY '03 Budget***
- **Performance Reports**
  - ⇒ Preliminary Performance Data in Agency Accountability Reports (FY 98 - released Mar. '99)
  - ⇒ First GPRA Official (FY 1999) - released Mar. 2000
  - ⇒ FY 2000 Performance Report - released June 2001 ***-FY '01 - Due Feb. 2002***

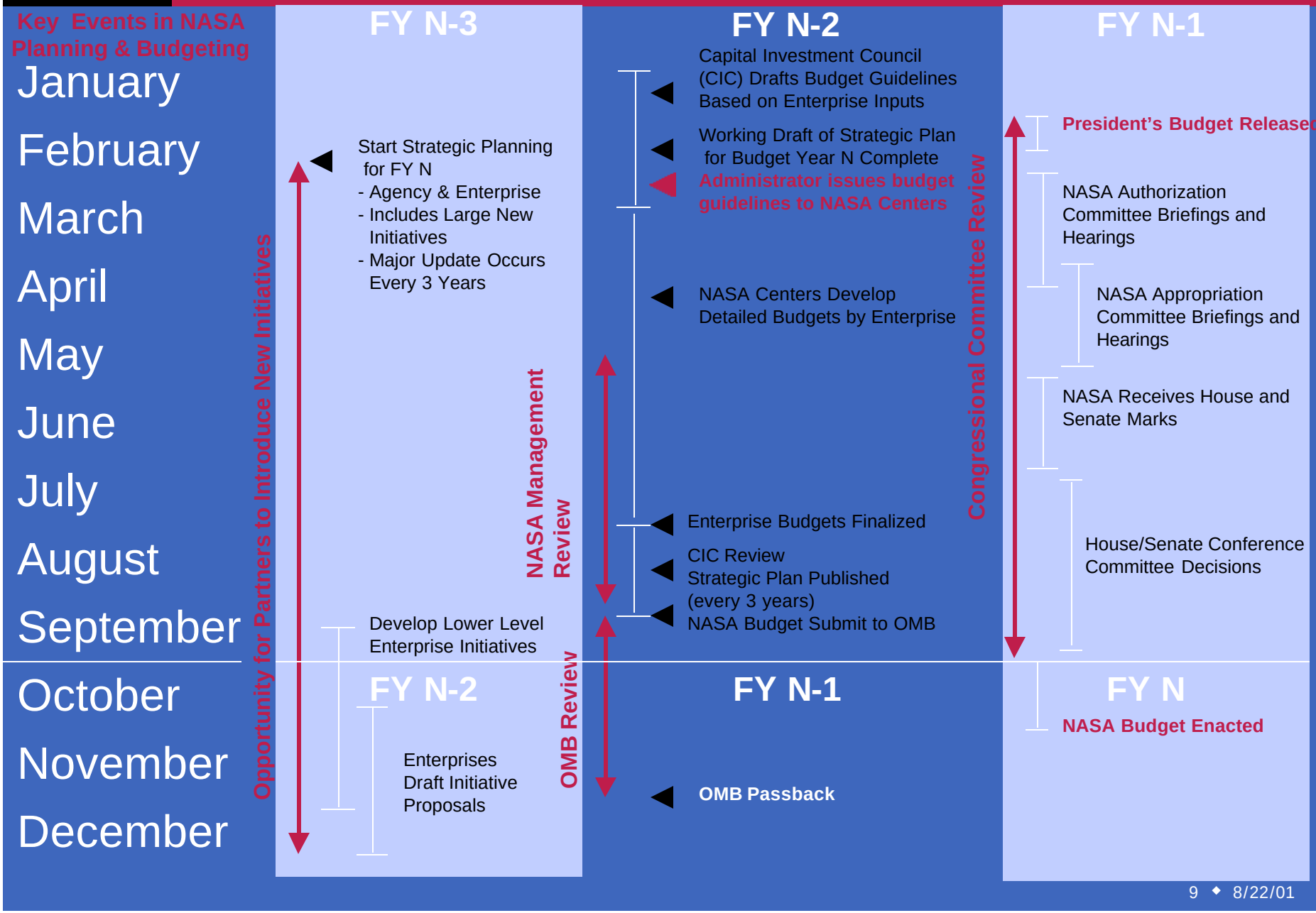
Documents available at : www.plans.nasa.gov

NASA Strategic Management System

NASA Planning, Budget & Evaluation Schedule



NASA Strategic Management System



NASA Strategic Management System

NASA Strategic Management Document Flowdown

Aligning Agency Activities with Policy and Goals

Constitution

↓

Laws (Congress) - Eg. National Aeronautics and Space Act of 1958

↓

Presidential Administration Policies & Directives - Eg.The National Space Policy

↓

NASA Strategic Plan > Performance Plan > Perf. Report

↓

Enterprise Strategic Plans & Functional Office Leadership Plans

↓

Center Implementation Plans

↓

Program Plans & Program Commitment Agreements

↓

Employee Individual Performance Plans

NASA Strategic Management System

The **NASA Strategic Management Handbook** describes how we manage; it lays the foundation for our Strategic Plan, Budget & Performance Plan, Performance Report, and the Agency's lower level planning documents.

NASA Strategic Management System

NASA Strategic Framework

Vision: **NASA is an investment in America's future. As explorers, pioneers, and innovators, we boldly expand frontiers in air and space to inspire and serve America and to benefit the quality of life on Earth.**

Mission:

To advance and communicate SCIENTIFIC KNOWLEDGE and understanding of Earth, the solar system, and the universe.

To advance **human exploration**, use, and development of space.

To research, develop, verify, and transfer advanced aeronautics and space **technologies**.

Strategic Enterprises:

Crosscutting Processes:

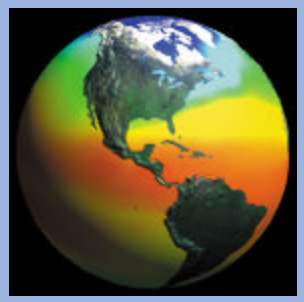
- **Manage Strategically**
- **Generate Knowledge**
- **Provide Aerospace Products and Capabilities**
- **Communicate Knowledge**

NASA Strategic Management System

NASA Enterprise Missions

Space Science

To discover how the Universe began and evolved, how we got here and where we are going, and whether we are alone.



Earth Science

To develop a scientific understanding of the Earth system and its response to natural and human-induced changes to enable improved prediction of climate, weather, and natural hazards for present and future generations.

Biological and Physical Research Enterprise

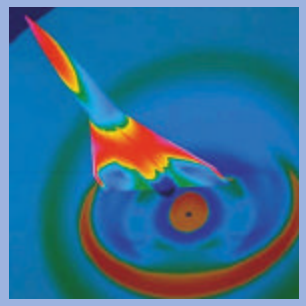
To use the synergy between physical, chemical and biological research in space to acquire fundamental knowledge and generate applications for space travel and Earth applications.

Human Exploration and Development of Space

To expand the frontiers of space and knowledge by exploring, using, and enabling the development of space for human enterprise.

Aerospace Technology

To maintain U.S. preeminence in aerospace research and technology.



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NASA Customers and Benefits

The American people are our ultimate customers represented by the Congress and the President.

Through our five Enterprises NASA contributes to National priorities: S&T understanding, Education, the Environment, the Economy, and Exploration

The American people are the ultimate resource provider and the ultimate beneficiaries of investments in NASA's mission of research, exploration and discovery.

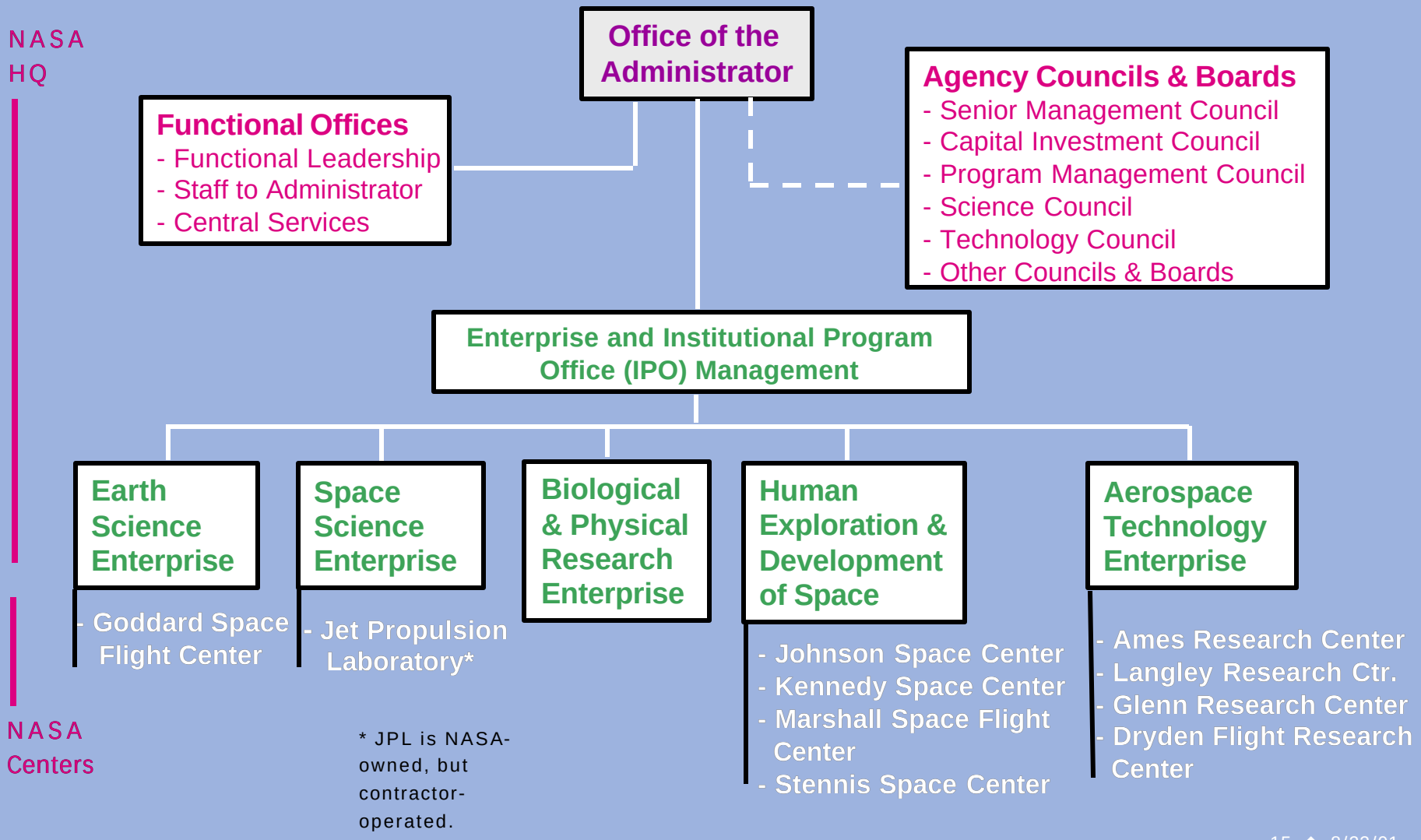
Congress and administration decision process responds to the public interest, votes, and funding resources.

NASA Enterprises serve primary customers in science, education, commerce, public policy, and in other Government agencies.

NASA Benefits: Create education excellence, economic growth and security, protect the environment, increase the understanding of science and technology, and peaceful exploration and discovery.

NASA Strategic Management System

NASA Management Structure



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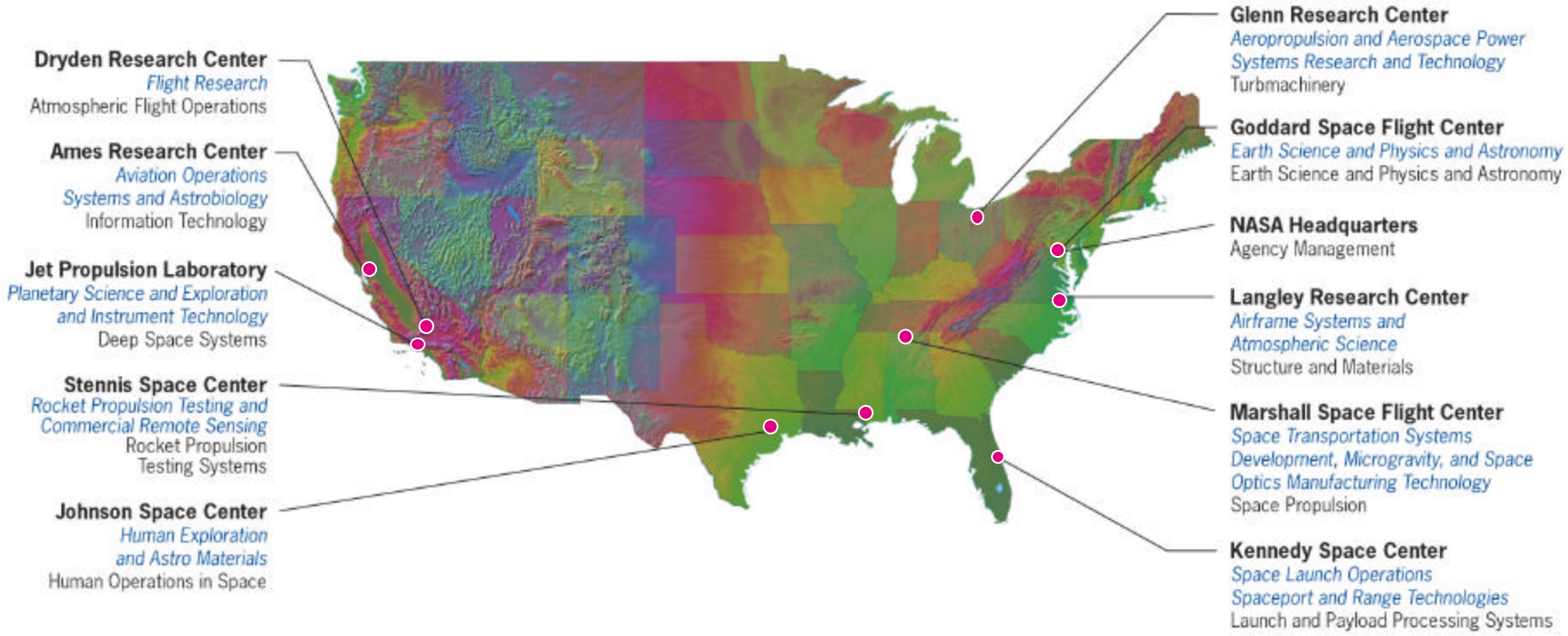
NASA Centers

NASA Centers:
Center Mission Areas and Centers of Excellence



NASA Strategic Management System

NASA HQ Organizational Structure

AA's & Chiefs report to the Administrator through the Official indicated by color >

Administrator A
Deputy Administrator
Chief of Staff AA **Associate Deputy Administrator** AI **Associate Deputy Administrator, Institutions** AB
Chief Engineer AE Chief Scientist AS Chief Health & Medical Officer AM Chief Information Officer AO

Inspector General W

Functional Offices

- **Chief Financial Officer** B
  - Budget, Finance, Planning, Strategic Management
- **General Counsel** G
- **Legislative Affairs** L
- **External Relations** I
  - International & Intergovernmental Affairs, Advisory Coms, History
- **Public Affairs** P
  - Media Relations, Exhibits, Speakers, Events, Public Information, www.nasa.gov,
- **Human Resources & Education** F
- **Equal Opportunity Programs** B
- **Management Systems and Facilities** J
  - Environmental, Facilities Logistics, & Aircraft Mgmt, and Mgmt Assessment
- **Procure-ment** H
- **Small and Disadvantaged Business Utilization** K
- **HQ Operations** C
  - HQ Budget, IT, Personnel, Facilities, Security, Printing, Correspondence
- **Security Management and Safeguards** X
- **Safety and Mission Assurance** Q

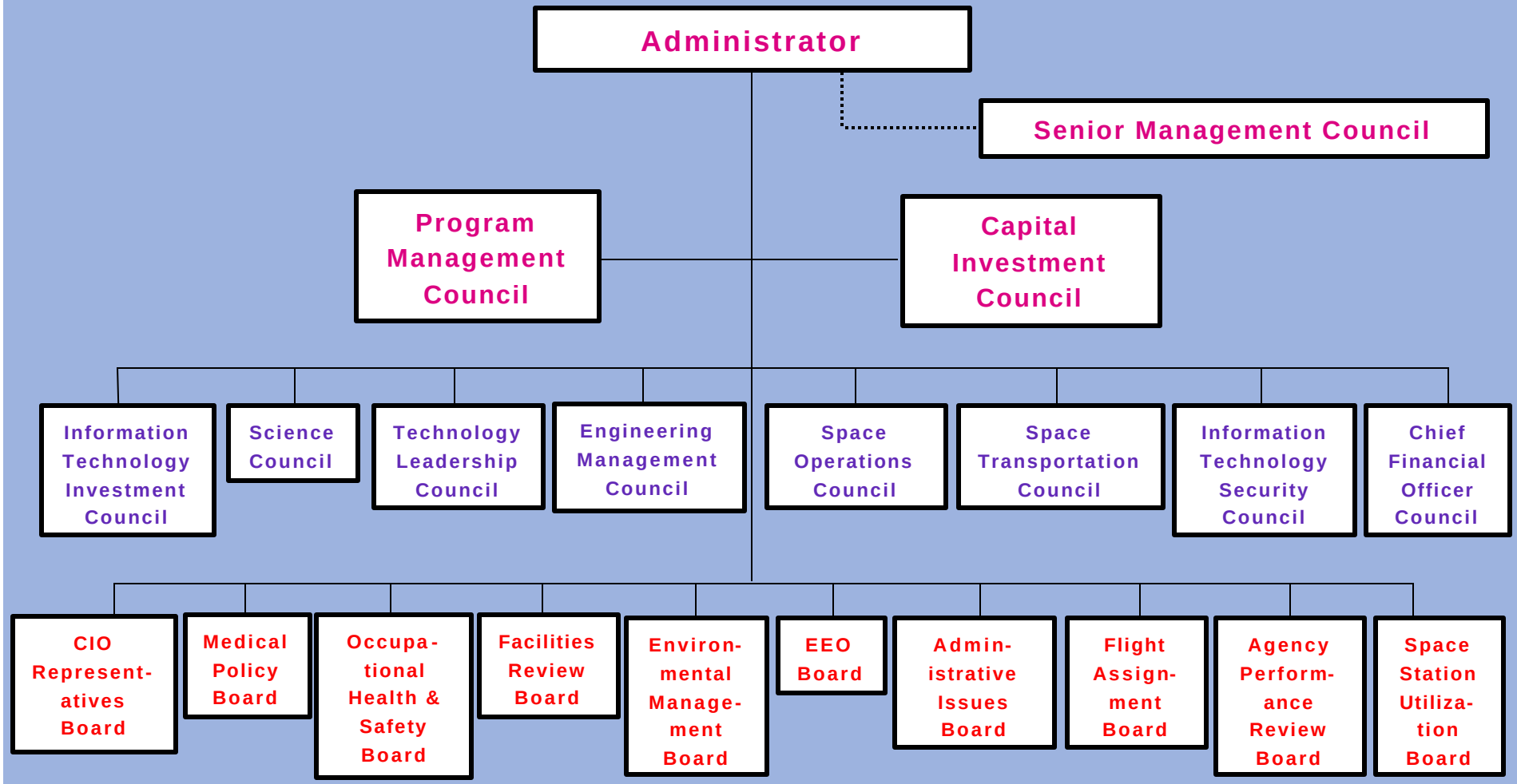
Program Offices

- **Earth Science** Y
- **Space Science** S
- **Biological & Physical Research** U
- **Space Flight** M
- **Aerospace Technology** R

NASA Organizations are often referred to by their Mail Code (or "Code") letter, rather than by acronym. These Code designations are shown.

NASA Strategic Management System

Agency Councils & Boards



NASA Strategic Management System

Enterprise Program Management
Roles & Responsibilities

Roles and Responsibilities	Strategy	Implementation Planning	Implementation and Evaluation
Enterprise Associate Administrator	• **Develop Enterprise Strategy** • **Customer Interface** • **Establish Program Requirements/Metrics** • **External Advocacy** • **Long-Term Investment Strategy** • **Formulate Programs**	• Coordinate Cross-Enterprise Activities • Integrate Enterprise Programs • Select Projects and Lead Centers • Allocate Budget to Programs • Approve Implementation Plans	• Assess Compliance and Performance Against Program Requirements and Customer Expectations
Lead Center Director*	• Integrate Strategies with Institutional Capabilities • Develop Centers of Excellence Strategies	• **Integrate Institutional Resources with Program Needs** • **Develop Implementation Plans (Total Center)** • **Coordinate Cross-Center Activities** • **Select Program Manager**	• Ensure Compliance to Policy/ Standards • Maintain Dual Path for Quality and Independent Assessment
Program Manager	• Support Headquarters Formulation • Conduct Feasibility Planning	• **Manage Program Planning** • **Develop Program Resource Needs** • **Establish Project Requirements and Performance Metrics** • **Balance Requirements/Resources**	• Implement Programs • Allocate Budgets to Projects • Project Oversight • Report Status • Control Program Changes
Project Manager	• Develop Specific Proposals • Innovate • Assess Technology Readiness	• Develop Alternatives • Establish Contracts and Support Agreements	• **Implement Projects** • **Administer Contracts** • **Manage Supporting Tasks Report Metrics**

Note: Bold type reflects primary management responsibilities.

* Center Directors with projects supporting programs perform functions similar to those of lead Center Directors, but at the project level at their individual centers.

NASA Strategic Management System

Science Management Roles and Responsibilities

Roles and Responsibilities	Strategy	Implementation	Evaluation
Chief Scientist	• **Science Policy Development**	• Consult on Science Enterprises Planning, Programs, and Budgets	• Assess Effectiveness of Policies and Integrated Science Results
Enterprise Associate Administrator	• **Develop Enterprise Strategy** • **Develop Science Plan** • **Establish Program Requirements** • **External Advocacy** • **External Coordination**	• **Advisory Committee Interface** • **Cross-Enterprise/Agency Coordination** • **Allocate Research/Program Budgets** • **Establish Science Priorities** • **Develop Research Campaigns** • **Select Research/Mission Proposals** • **Oversee International Partnering**	• Assess Compliance and Performance Against Strategic Plan • Integrate Research Results • Program Assessment
Center Scientist	• Contribute to Science Plan Development	• Develop Project Science Plans with the Science Community • Support External Investigations • Project Scientist Management • Conduct Successfully Proposed Research	• **Support Program Evaluation**
Lead Center*/ Program Manager	• Support Program Definition • Assess Technology Readiness	• Develop Mission Alternatives • Manage Program Planning • Establish Project Structure • Manage Execution	• **Support Program Evaluation**
* When required for enabling technology programs and flight and ground system development programs			

Note: Bold type reflects primary management responsibilities.

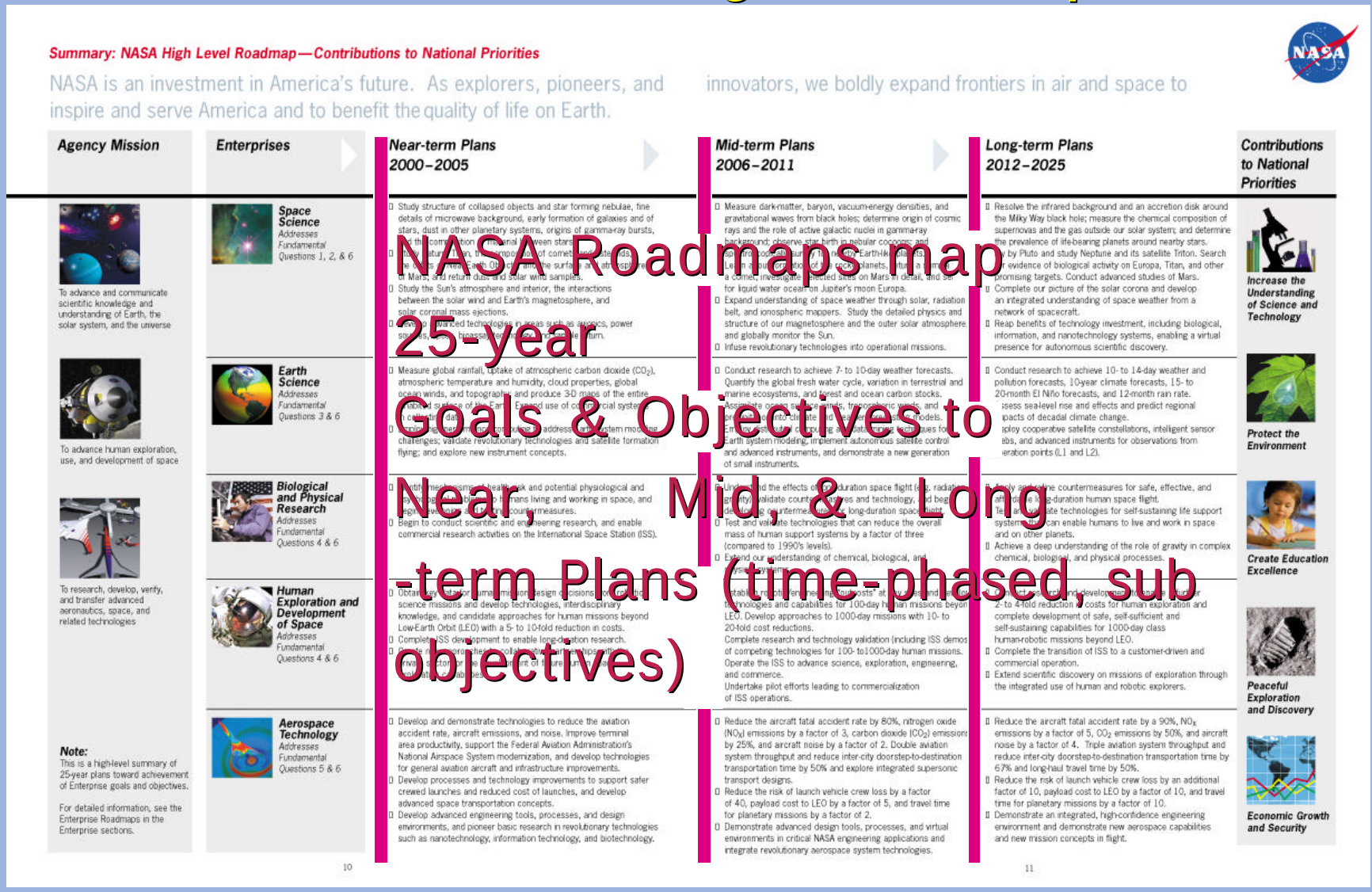
NASA Strategic Management System

Functional Office Roles and Responsibilities

	Functional Leadership	Staff to the Administrator	Central Service
Intent	• Efficiency • Effective Support to Agency Mission	• Cross-Enterprise Balance and Synergy • Ensure Consistent Message to External Customers • Statutory Compliance and Accountability	• Efficiency
Products	• Policy/Standards • Budget Guidance • Functional Leadership Plans • Assessments/Reports Improvements • Standards and Architecture • Training	• Recommendations • Assessments and Reports • Communiqués • Functional Initiatives	• Discrete Service • Enterprise Staff Support
Customer	• Enterprises/Centers	• Administrator	• Enterprises/Centers
Principal Activities	• Coordination and Integration • Establish Policies • Insight and Review • Internal Focal Point • External Liaison • Analysis and Reporting • Facilitate Standards Development • Facilitate Capital Investment	• Coordination and Planning • External Liaison • Analysis and Reporting • Independent Assessment • Functional Initiative Sponsorship and Direction	• Requirements Determination and Consolidation • Assessment • Support
Mode of Operation	• Value-Added Policy and Standards • Extensive Involvement of Customers and Stakeholders, Including Enterprises and Centers	• Independent Reporting to Administrator, Coordinated with Enterprises as Appropriate	• Customer Responsiveness • Co-located (Staff Only) • Negotiate Implementation Plans • Negotiate Performance Plans
Examples	• Human Resources Planning • Development of NASA's Financial Management Planning System • Environmental Management and Coordination • Facilities Management	• Coordinating Public Affairs Activities and Events • Legislative Hearing Coordination • Agency Strategic and Performance Plan Dev	• PAO (Headquarters Only) • Communications Network • Agency Training and Education

NASA Strategic Management System

NASA Strategic Roadmaps



Summary: NASA High Level Roadmap—Contributions to National Priorities

NASA is an investment in America's future. As explorers, pioneers, and innovators, we boldly expand frontiers in air and space to inspire and serve America and to benefit the quality of life on Earth.

Agency Mission	Enterprises	Near-term Plans 2000–2005	Mid-term Plans 2006–2011	Long-term Plans 2012–2025	Contributions to National Priorities
To advance and communicate scientific knowledge and understanding of Earth, the solar system, and the universe	**Space Science** *Addresses Fundamental Questions 1, 2, & 6*	▯ Study structure of collapsed objects and star forming nebulae, fine details of microwave background, early formation of galaxies and of stars, dust in other planetary systems, origins of gamma-ray bursts, [illegible] ▯ Study the Sun's atmosphere and interior, the interactions between the solar wind and Earth's magnetosphere, and solar coronal mass ejections. ▯ Develop advanced technologies in areas such as aerobots, power sources, [illegible]	▯ Measure dark-matter, baryon, vacuum-energy densities, and gravitational waves from black holes; determine origin of cosmic rays and the role of active galactic nuclei in gamma-ray background; observe star birth in nebular cocoons; and [illegible] ▯ Expand understanding of space weather through solar, radiation belt, and ionospheric mappers. Study the detailed physics and structure of our magnetosphere and the outer solar atmosphere and globally monitor the Sun. ▯ Infuse revolutionary technologies into operational missions.	▯ Resolve the infrared background and an accretion disk around the Milky Way black hole; measure the chemical composition of supernovas and the gas outside our solar system; and determine the prevalence of life-bearing planets around nearby stars. [illegible] by Pluto and study Neptune and its satellite Triton. Search [illegible] for evidence of biological activity on Europa, Titan, and other promising targets. Conduct advanced studies of Mars. ▯ Complete our picture of the solar corona and develop an integrated understanding of space weather from a network of spacecraft. ▯ Reap benefits of technology investment, including biological, information, and nanotechnology systems, enabling a virtual presence for autonomous scientific discovery.	***Increase the Understanding of Science and Technology***
To advance human exploration, use, and development of space	**Earth Science** *Addresses Fundamental Questions 3 & 6*	▯ Measure global rainfall, uptake of atmospheric carbon dioxide (CO_2), atmospheric temperature and humidity, cloud properties, global ocean winds, and topography, and produce 3-D maps of the entire [illegible] ▯ [illegible] challenges; validate revolutionary technologies and satellite formation flying; and explore new instrument concepts.	▯ Conduct research to achieve 7- to 10-day weather forecasts. Quantify the global fresh water cycle, variation in terrestrial and marine ecosystems, and forest and ocean carbon stocks. [illegible] ▯ [illegible] Earth system modeling, implement autonomous satellite control and advanced instruments, and demonstrate a new generation of small instruments.	▯ Conduct research to achieve 10- to 14-day weather and pollution forecasts, 10-year climate forecasts, 15- to 20-month El Niño forecasts, and 12-month rain rate. [illegible] ssess sea-level rise and effects and predict regional [illegible] pacts of decadal climate change. [illegible] ploy cooperative satellite constellations, intelligent sensor [illegible] ebs, and advanced instruments for observations from [illegible] eration points (L1 and L2).	***Protect the Environment***
To research, develop, verify, and transfer advanced aeronautics, space, and related technologies	**Biological and Physical Research** *Addresses Fundamental Questions 4 & 6*	▯ [illegible] ▯ Begin to conduct scientific and engineering research, and enable commercial research activities on the International Space Station (ISS).	▯ Test and validate technologies that can reduce the overall mass of human support systems by a factor of three (compared to 1990's levels). ▯ Extend our understanding of chemical, biological, and [illegible]	▯ [illegible] countermeasures for safe, effective, and [illegible] [illegible] ge-duration human space flight. [illegible] ate technologies for self-sustaining life support [illegible] can enable humans to live and work in space and on other planets. ▯ Achieve a deep understanding of the role of gravity in complex chemical, biological, and physical processes.	***Create Education Excellence***
	Human Exploration and Development of Space *Addresses Fundamental Questions 4 & 6*	▯ Obtain [illegible] science missions and develop technologies, interdisciplinary knowledge, and candidate approaches for human missions beyond Low-Earth Orbit (LEO) with a 5- to 10-fold reduction in costs. ▯ Complete ISS development to enable long-duration research.	Establish [illegible] technologies and capabilities for 100-day human missions beyond LEO. Develop approaches to 1000-day missions with 10- to 20-fold cost reductions. Complete research and technology validation (including ISS demos of competing technologies for 100- to1000-day human missions. Operate the ISS to advance science, exploration, engineering, and commerce. Undertake pilot efforts leading to commercialization of ISS operations.	[illegible] 2- to 4-fold reduction in costs for human exploration and complete development of safe, self-sustaining capabilities for 1000-day class human-robotic missions beyond LEO. ▯ Complete the transition of ISS to a customer-driven and commercial operation. ▯ Extend scientific discovery on missions of exploration through the integrated use of human and robotic explorers.	***Peaceful Exploration and Discovery***
Note: This is a high-level summary of 25-year plans toward achievement of Enterprise goals and objectives. For detailed information, see the Enterprise Roadmaps in the Enterprise sections.	**Aerospace Technology** *Addresses Fundamental Questions 5 & 6*	▯ Develop and demonstrate technologies to reduce the aviation accident rate, aircraft emissions, and noise. Improve terminal area productivity, support the Federal Aviation Administration's National Airspace System modernization, and develop technologies for general aviation aircraft and infrastructure improvements. ▯ Develop processes and technology improvements to support safer crewed launches and reduced cost of launches, and develop advanced space transportation concepts. ▯ Develop advanced engineering tools, processes, and design environments, and pioneer basic research in revolutionary technologies such as nanotechnology, information technology, and biotechnology.	▯ Reduce the aircraft fatal accident rate by 80%, nitrogen oxide (NO_X) emissions by a factor of 3, carbon dioxide (CO_2) emissions by 25%, and aircraft noise by a factor of 2. Double aviation system throughput and reduce inter-city doorstep-to-destination transportation time by 50% and explore integrated supersonic transport designs. ▯ Reduce the risk of launch vehicle crew loss by a factor of 40, payload cost to LEO by a factor of 5, and travel time for planetary missions by a factor of 2. ▯ Demonstrate advanced design tools, processes, and virtual environments in critical NASA engineering applications and integrate revolutionary aerospace system technologies.	▯ Reduce the aircraft fatal accident rate by a 90%, NO_X emissions by a factor of 5, CO_2 emissions by 50%, and aircraft noise by a factor of 4. Triple aviation system throughput and reduce inter-city doorstep-to-destination transportation time by 67% and long-haul travel time by 50%. ▯ Reduce the risk of launch vehicle crew loss by an additional factor of 10, payload cost to LEO by a factor of 10, and travel time for planetary missions by a factor of 10. ▯ Demonstrate an integrated, high-confidence engineering environment and demonstrate new aerospace capabilities and new mission concepts in flight.	***Economic Growth and Security***

10 11

NASA Roadmaps map 25-year Goals & Objectives to Near-, Mid-, & Long-term Plans (time-phased, sub objectives)

NASA Strategic Management System

NASA Strategic Architecture

Enterprises & Crosscutting Processes

Many R&D Goals & Objectives are long-term (25+ years)

Goals

By law, Performance Targets are annual to correspond with the annual budget

Objectives

Roadmaps

Roadmaps help bridge this gap by showing progress toward goals in 5+ year periods

Performance Targets

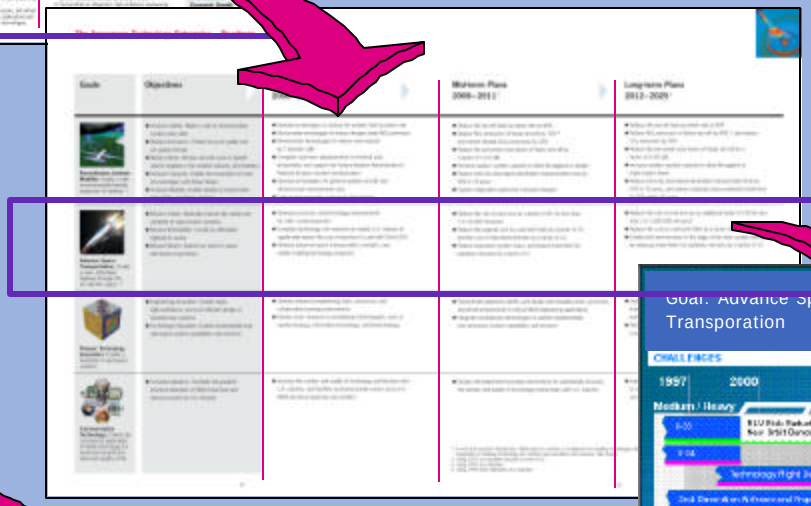
Performance Indicators

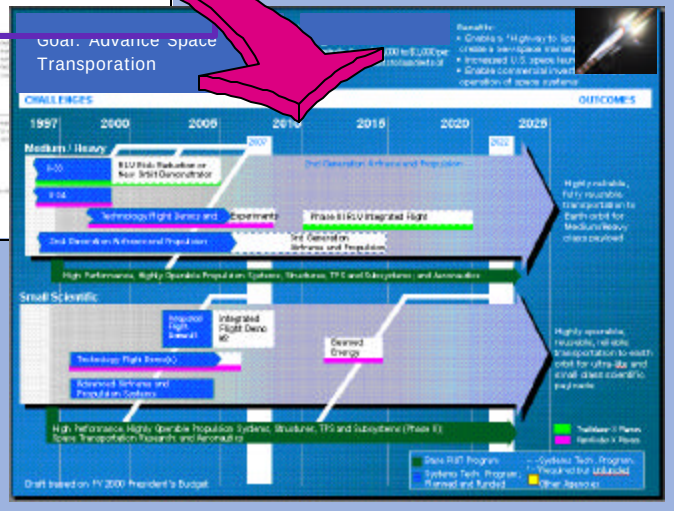
NASA Strategic Management System

NASA Roadmaps

Roadmaps show interim plans toward achievement of strategic objectives, in three time periods, over a 25 year time frame.

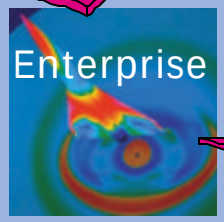
They flow from the Agency level to the Enterprise level, and are being developed at the objective level as well.





Agency

Enterprise



Goal

Performance Planning

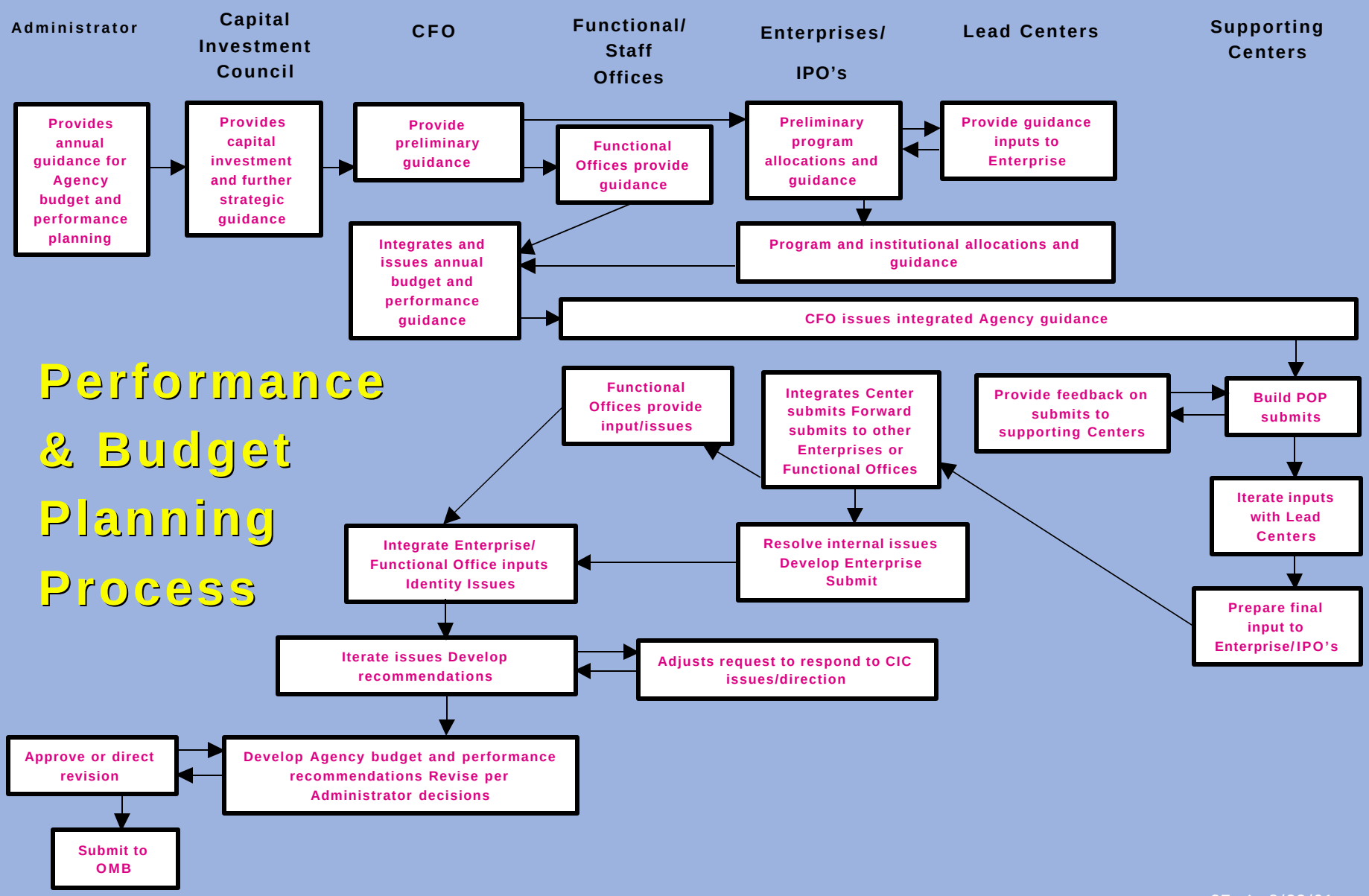
7 Characteristics of a Good Metric

- **Represents what program managers "care about"**
  - Should be meaningful -- reflecting NASA's priorities
- **Challenging but achievable**
  - Should involve a stretch element
- **Demonstrate a commitment to goal achievement**
  - Must represent our anticipated annual progress
- **Reflect quantifiable and measurable levels of achievement**
  - What gets measured gets done
- **Verifiable**
  - Must be possible to verify and validate actual performance
- **Relevant**
  - Must demonstrate public benefit
- **Provide Context**
  - Metric achievement must tie in with mission accomplisment

Performance Planning Challenges for R&D

- **Challenge is to develop metrics which provide outcomes as opposed to outputs**
  - **Basic research results are difficult to quantify in advance of discovery; may require follow-up questionnaires, surveys, statistics**
  - **Annual Metrics for multi-year research and development programs are "output" in nature since the program is not mature enough to deliver "outcome" results for several years**
    - » Eg. Planetatry exploration missions in transit to their destination; basic research efforts
  - **Metrics are developed 12-15 months in advance predicting R&D results**
    - » External stakeholders perceive changes at the time of execution as a lack of planning

NASA Strategic Management System



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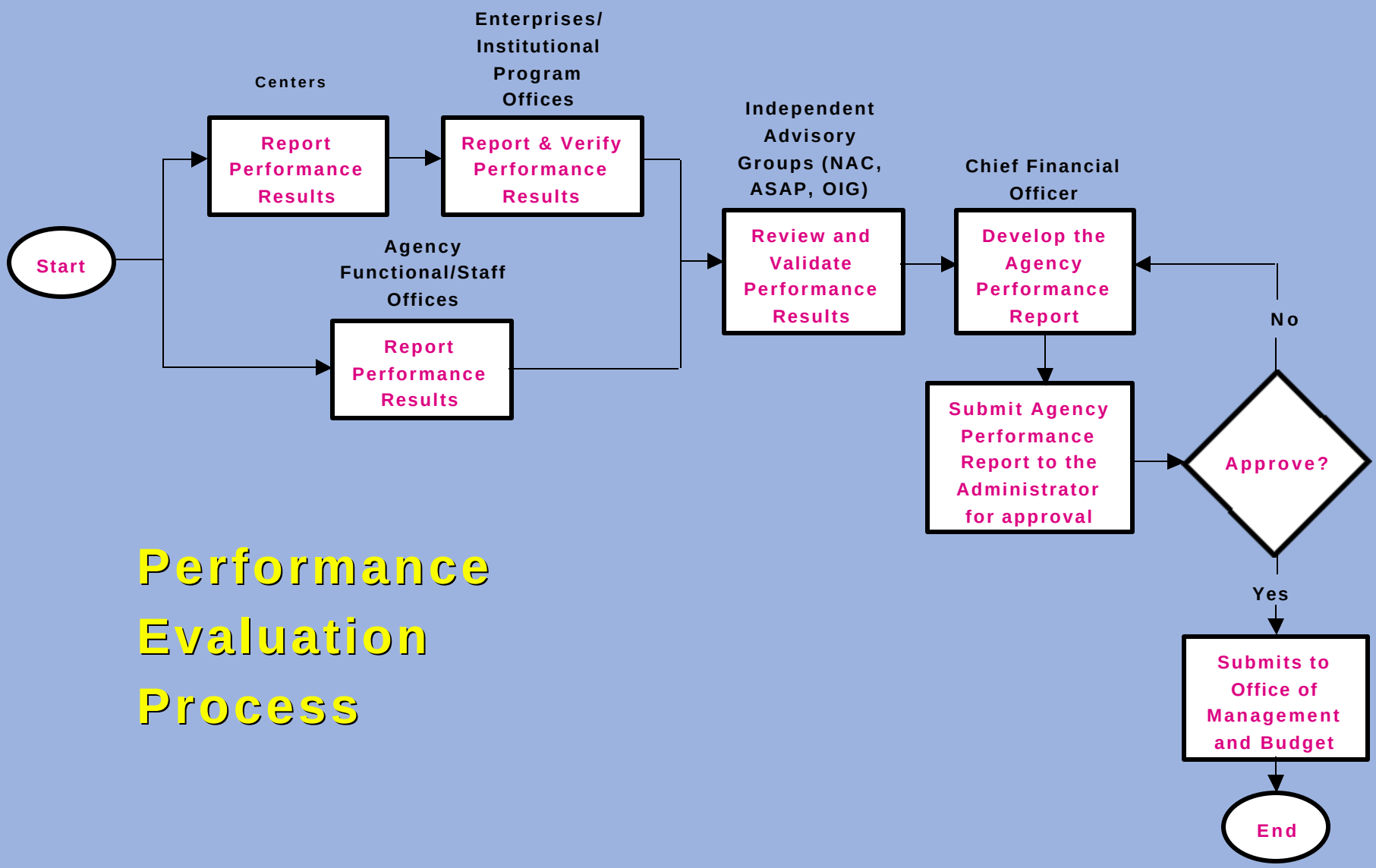
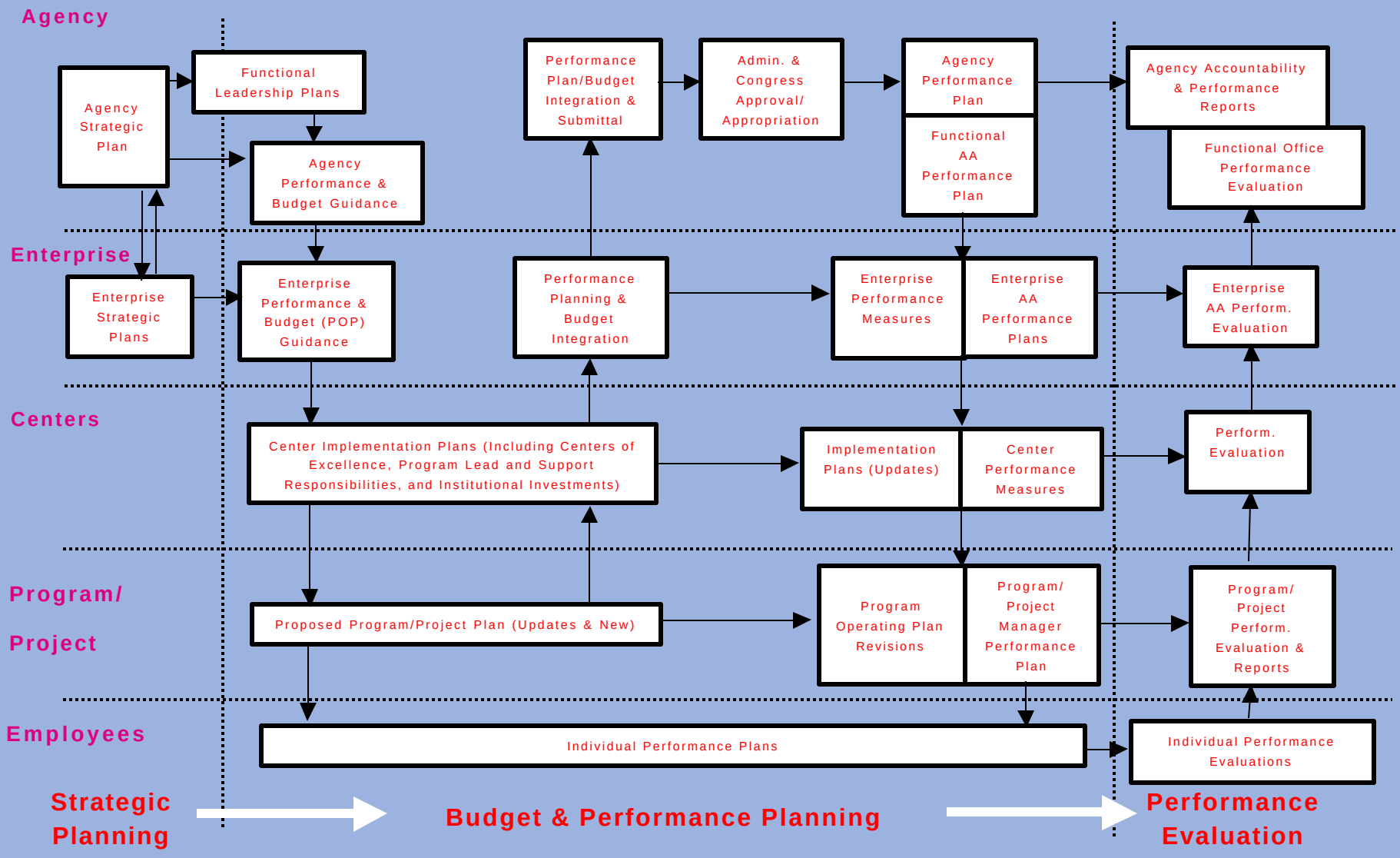


Performance Evaluation Process

NASA Strategic Management System

Strategic Elements by Level & Process



NASA Strategic Management System

Bush Administration Government Reform Agenda

- **Making Government Citizen-centered**
  - Flatten the Federal hierarchy
  - Expanded use of the internet
  - E-Government fund to support interagency initiatives
- **Making Government Results-oriented**
  - Link budget and management decisions to performance
  - Ensure financial accountability
  - Use capital planning to improve performance, especially investments in information technology
  - Eliminate duplicative and ineffective programs
  - Expanded use of Performance-based Contracts
  - Incorporate successful private sector reforms
- **Making Government Market-Based**
  - Make e-Procurement the government-wide standard
  - Open government to competition

NASA Strategic Management System

Bush Administration Government Reform Agenda

- **FY 2002 Agency performance plans**
  - Agency-specific metrics
  - Also incorporate goals for Presidential initiatives, government-wide, and agency-specific reform proposals
- **NASA specific reform direction**
  - International Space Station: ensure that future Station costs will remain within the President's FY 2002 budget plan; restore cost estimating credibility
  - Space Shuttle Privatization: aggressively pursue privatization opportunities that improve safety and operational efficiency
  - Space Launch Opportunities: Space Launch Initiative provides opportunity for industry to meet NASA's future launch needs
  - Critical capabilities: develop an integrated, long-term agency plan that ensures a national capability to support NASA's mission -- what capabilities must be retained, discontinued or led outside the agency; expanding collaboration with industry, universities, and other agencies

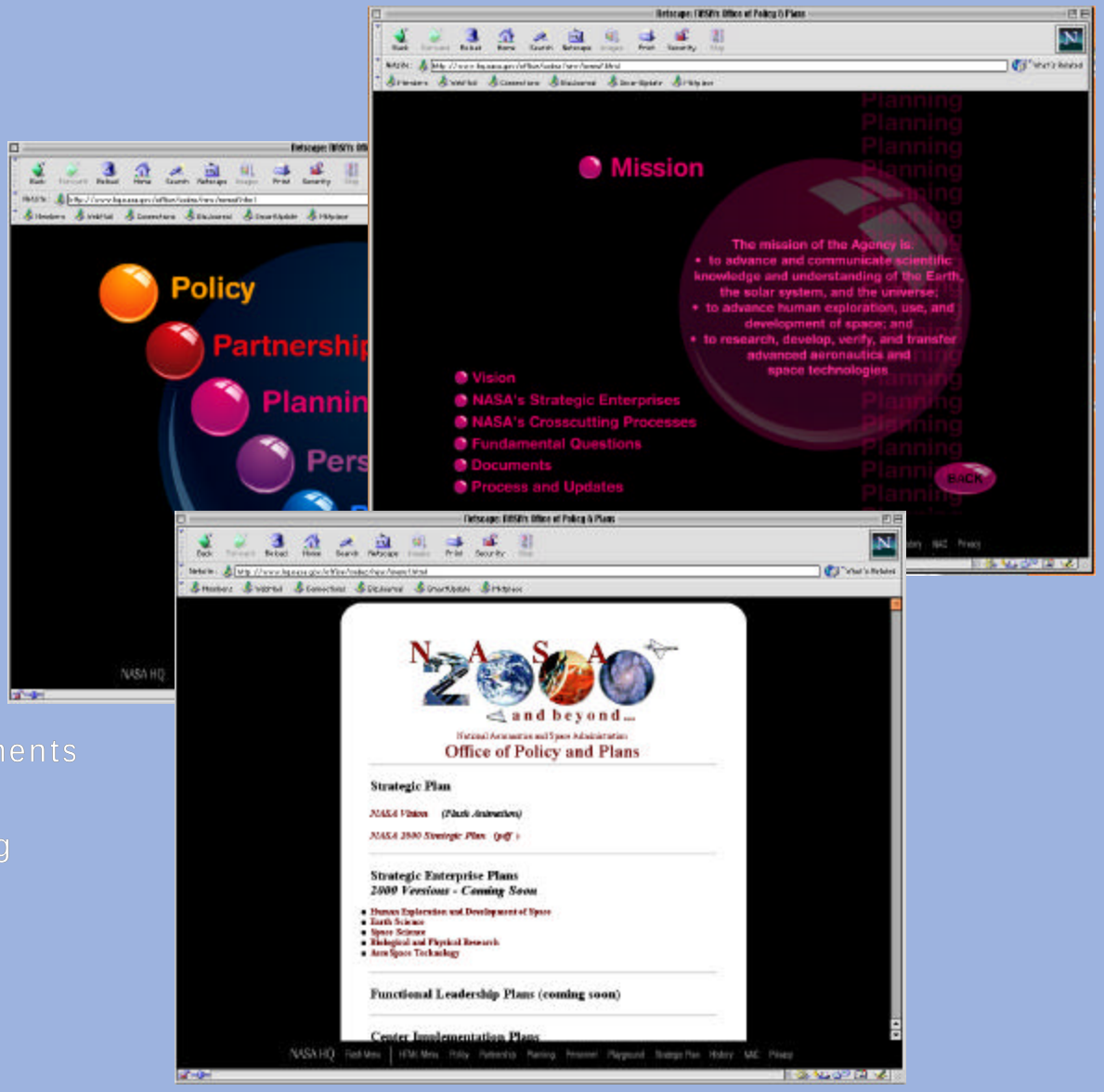
NASA Strategic Management System

NASA Planning on the Web

Information on NASA Planning is available at:
www.plans.nasa.gov

-See the Flash animation Of the NASA Vision Statement

-Click Planning for an overview of NASA Planning

-Click Strategic Plan at the Bottom of the page to see a master Menu of all NASA planning documents

-And see historical NASA Planning Documents in the Archive